Chapter II

COMMAND AND CONTROL

1. Background

This chapter provides an overview of the C2 system, principles of C2, and responsibilities for C2 communications. It also describes the C2 organizations and facilities and C2 communications architecture of both the DRB and MEF (FWD). It concludes with a detailed discussion of techniques and procedures that facilitate the C2 of the joint force.

2. Terminology

The joint lexicon features a variety of terms and acronyms that define the concept of C2. Throughout ensuing discussions, *"command"* refers to the JFC's vested authority as defined in Joint Pub 1-02, *Department of Defense Dictionary of Military and Associated Terms.* C2 indicates the process that JFCs use to plan, direct, coordinate, and control forces to accomplish assigned missions. C2 system; command, control and communications (C3) system; or command, control, communications, and computer (C4) system consist of those integrated systems of doctrine, procedures, organizations, personnel, equipment, facilities, and communications that support the JFC's C2 of the joint force.

3. C2 System

An effective C2 system—

a. Provides the JFC accurate, timely information for developing feasible courses of action and making logical decisions.

b. Translates the JFC's decisions into plans and orders.

c. Communicates those plans and orders to subordinates.

d. Supervises the execution of plans and orders.

e. Communicates subordinate requirements to higher authorities.

4. Principles of C2

The basis for C2 of integrated Army-Marine forces proceeds from the JFC's application of the following principles:

a. Clear command relationships.

b. Assignment of missions and tasks consistent with the capabilities of the respective AMCI forces.

c. Missions and tasks simply stated and to the point.

d. Missions, tasks, and resources in reasonable balance.

e. Functional responsibilities for all players in the C2 process clearly defined.

f. Continuous coordination among staff elements and with the JFC.

g. Essential elements of information integrated into information management and communications systems.

h. Detailed plans prepared for both combat operations and for transitions from combat to other military operations.

5. C2 Communications

C2 communications encompass the means by which the command transmits and receives information and orders. The JFC must understand the capabilities, limitations, and vulnerabilities of the communications systems supporting and operating within the joint force. Communications planning must accommodate potential collateral interference from friendly units as well as interference from

enemy forces that use the same electromagnetic spectrum and the effects of terrain and atmospheric conditions.

a. Service Responsibilities. Service C2 responsibilities normally parallel other command relationships and assigned responsibilities. With regard to specific C2 responsibilities, services—

(1) Provide, operate, and maintain the C2 facilities organic to their own tactical forces, including organic service elements.

(2) Provide, operate, and maintain terminal equipment on defense communications system access circuits, circuits required for communications with elements of other services, and associated circuit facilities that may be assigned or mutually agreed.

(3) Provide, operate, and maintain interoperable and compatible C2 systems for distress, disaster, emergency, and safety as directed by proper authority.

b. Joint Force Responsibilities. The JFC defines specific communications related responsibilities for elements of the joint force. Typical responsibilities for establishing and maintaining communications include—

(1) Senior to Subordinate. A senior unit establishes and maintains communications with subordinate units, including attachments of any size.

(2) Supporting to Supported. A supporting unit establishes communications with the supported unit.

(3) Reinforcing to Reinforced. A reinforcing unit establishes communications with the reinforced unit.

(4) Passing to Passed. In a forward passage of lines, the passing unit establishes communications with the passed (in-place) unit.

(5) Passed to Passing. In a rearward passage of lines, the passed (in-place) unit establishes communications with the passing unit.

(6) Lateral Communications. Responsibility for establishing lateral communications between adjacent units may be fixed by the next higher commander or by standing operating procedures (SOP). When responsibility is not fixed by orders, commanders establish communications on a spatial basis from left to right and from the rear forward.

6. Army C2

The Army's perspective on the C2 of forces centers on a conceptual framework known as *battle command.* Battle command embodies the art of decisionmaking, leading, and motivating soldiers and their organizations to accomplish mission and includes the components of both command and control.

a. Decisionmaking. The Army ascribes to a systematic tactical decisionmaking process described in FM 101-5, *Staff Organization and Operations,* and in the US Army Command and General Staff College's, *The Tactical Decisionmaking Process.*

b. Command. In exercising battle command, the commander envisions the actions over time and space that will achieve the desired end state. During the fight, the commander makes adjustments to create or exploit opportunities and selects the critical time and place to act to achieve decisive results.

c. Control. Unlike the art of command, control reflects an empirical approach to warfighting that falls largely within the purview of staffs. Control implies the science of computing requirements to fight and sustain the battle, identifying variances from initial calculations, correcting deviations from guidance, and measuring, analyzing, and reporting performance. The ultimate

objective of control is to provide the commander with the systems and tools needed to command the force.

7. Army Tactical C2 System (ATCCS)

a. ATCCS is an integrated, ground mobile, and fixed deployable network of common hardware and software for echelons at corps and below. Its purpose is to assist commanders and their staff to obtain a near real-time access to command critical information requirements (task organization, maneuver, engineer, NBC, signal, Army airspace C2, fire support, air defense, intelligence and electronic warfare (IEW), CSS, resources, and enemy situation) through a force level database.

b. The ATCCS architecture includes five constituent battlefield functions analysis systems:

(1) The Maneuver Control System (MCS) is the primary automated decision support/information system supporting the tactical commander and staff. The MCS provides the functional applications necessary to access and manipulate the force level information (FLI) database to satisfy all stated commander's critical information requirements (CCIR) for a specific operation, to effect timely control of current combat operations (deep, close, and rear), and to effectively develop and distribute plans and estimates in support of future operations.

(2) The All Source Analysis System (ASAS) is the intelligence and EW component of the ATCCS. It is a mobile, tactically deployable, computer-assisted intelligence and EW, analysis, reporting, and technical control system. ASAS receives and rapidly processes large volumes of combat information and sensor reports from all sources to provide timely and accurate targeting information, intelligence products, and threat alerts such as collection management, intelligence processing and reporting, high value/high payoff target processing and nominations, and communications processing and interfacing.

(3) The Forward Area Air Defense Command, Control, Communications, and Intelligence (FAAD C3I) System provides the automated interface between the Forward Area Air Defense System (FAADS) and the C2 nodes within the ATCCS. Functional applications include—

(a) Alerting supported field forces of impending air action.

(b) Providing hostile aircraft cueing to forward area air defense (FAAD) units.

(c) Providing rapid dissemination and acknowledgment of air battle management information.

(d) Providing exchange, processing, and display of air defense command information.

(e) Providing an automated decision support for the planning, coordinating, controlling, and executing of air defense support.

(4) The Combat Service Support Control System (CSSCS) provides critical, timely, integrated, and accurate automated logistical information to include all classes of supply and combat health support (CHS), personnel and movement information to CSS, maneuver, theater commanders, and logistic and special staffs.

(5) The Advanced Field Artillery Tactical Data System (AFATDS) provides automated decision support for the fire support (FS) function, to include joint and combined fires. The AFATDS provides a fully integrated FS C3 system, giving the FS coordinator automated support for planning, coordinating, controlling, and executing close support, counterfire, interdiction, and SEAD systems. AFATDS performs all the FS operational functions, to include automated allocation and distribution of fires based on target value analysis.

8. DRB C2 Organization and Facilities

The DRB commander commands and controls the brigade through an echeloned organizational structure that includes the command group, tactical command post (TAC CP), main CP, and rear CP. Tables II-1 through II-4 describe the functions and characteristics of each of these organizations.

a. Command Group. The DRB command group consists of the commander and staff deemed necessary to help command and control the fight. Personnel typically include the intelligence staff officer (S2), operations staff officer (S3), fire support coordinator (FSCOORD), and air liaison officer (ALO). METT-T may dictate inclusion of the brigade engineer, air defense officer, aviation officer, subordinate commanders, or special staff officers. Because the command group fights the battle from the location of the commander, it is a small, highly mobile organization that displaces with the ebb and flow of the tactical situation.

b. TAC CP. The TAC CP conducts ongoing close operations. The TAC CP provides the commander with a small staff composed of S2, S3, fire support, ALO, aviation, air defense, and other personnel as required. The TAC CP operates well forward in the DRB's area of operations (AO), typically within several kilometers of the forward edge of the battle area (FEBA) or forward line of own troops (FLOT), depending on the situation. It affords the commander the capabilities of exercising C2 over the DRB and planning close operations.

c. Main CP. The main CP or tactical operations center (TOC) provide continuity for DRB operations by synchronizing the entire C2 system. The main CP monitors the close fight, plans future operations, conducts deep operations, and coordinates combat, CS, and CSS requirements to support ongoing and future operations. The main CP includes current operations, plans, intelligence, fire support, communications, and Army airspace command and control (A2C2) sections.

d. Rear CP. The rear CP sustains the force during current operations, forecasts future CSS requirements, and conducts rear operations. The personnel or manpower staff officer (S1) controls the rear CP and normally collocates with the forward support battalion (FSB) CP in the brigade support area.

Table II-1. DRB Command Group Functions and Characteristics

PRIMARY FUNCTIONS	• Influence the battle • Issue planning guidance • Conduct ongoing close operations • Disseminate the commander's intent
CHARACTERISTICS	• Comprised of DRB commander and selected personnel • Led by commander • Small size affords reduced physical and electronic signatures • Can relocate to any position on battlefield • Communicates on move

Table II-2. DRB Tactical CP Functions and Characteristics

PRIMARY FUNCTIONS	• Controls ongoing close operations • Provides the commander with combat critical information • Maintains current close operations situation • Disseminates the commander's decisions
CHARACTERISTICS	• Positioned forward in brigade AO • Operates in mounted or dismounted modes • Organized as a single, cohesive cell • Small, highly mobile • Comparatively low electronic signature to provide security • Controlled by brigade S3

Table II-3. DRB Main CP Functions and Characteristics

PRIMARY FUNCTIONS	• Assists the brigade and task force • Plans future operations • Coordinates operations throughout the depth of the AO • Synchronizes CS and CSS assets as directed by the BDE CDR • Executes planned deep attacks • Monitors the close fight • Fights rear operations • Keeps higher headquarters informed • Coordinates with adjacent units • Maintains continuous operations for extended periods • Assumes C2 of close operations if the TAC CP is destroyed
CHARACTERISTICS	• Organized by functional cells • Operates in mounted or dismounted modes • Positioned in brigade rear area • Controlled by brigade executive officer

Table II-4. DRB Rear CP Functions and Characteristics

PRIMARY FUNCTIONS	• Tracks current battle • Sustains current deep and close operations • Forecasts future CSS requirements • Conducts detailed CSS planning • Serves as the entry point for units entering the brigade rear area • Coordinates with the FSB CP (collocate)
CHARACTERISTICS	• Positioned in brigade support area • Collocates with forward support battalion • Operates in mounted or dismounted modes

9. DRB Communications Architecture

Two sources provide communications support for the DRB: the communications platoon organic to the brigade headquarters and a signal section provided by the parent divisional signal battalion.

a. DRB Communications Platoon. Table II-5 describes the capabilities arid limitations of the communications platoon organic to the DRB's headquarters and headquarters company (HHC).

b. Signal Section. A signal section that is nonorganic and resourced from divisional assets also provides communications support to the DRB. The section augments the capabilities of the brigade signal platoon and provides the DRB access and connectivity into the MSE network. Table II-6 describes the capabilities and limitations of the signal section.

Table II-5. DRB Signal Platoon Capabilities/Limitations Summary

CAPABILITIES	LIMITATIONS
• Provide FM radio net control communications • Install, operate, and maintain internal wire communications • Install, operate, and maintain FM radio retransmission to higher HQ • Install, operate, and maintain IHFR communications • Provide tactical facsimile (FAX) capability • Manage COMSEC material • Provide local area network (LAN) management and connectivity into the wide area network (WAN)	• No mobile subscriber equipment (MSE) capability • Limited ability to establish external connectivity • Limited communications redundancy and equipment

Table II-6. DRB Signal Section Capabilities/Limitations Summary

CAPABILITIES	LIMITATIONS
• Provide secure long haul multichannel tactical satellite (TACSAT) communications connectivity into higher HQ communications network • Provide secure net radio interface into the MSE network • Provide MSE automated switching service to network subscribers • Install and maintain MSE network for the DRB • Install, operate, and maintain secure SC TACSAT communications • Provide remote access unit (RAU) coverage sufficient to support the DRB force	• Cannot support full range of MEF MSE requirements • Increased requirement to logistically support additional signal assets

10. USMC C2 Philosophy

To defeat the enemy, the MAGTF's decision and execution cycle must be faster than the enemy's. Therefore, the ultimate objective of Marine Corps C2 is to achieve unity of effort and increase the tempo of operations. Unity of effort and tempo integrate maneuver, firepower, and sustainment to generate the decisive combat power required by Marine warfare doctrine. An increased tempo of operations requires shorter decision cycles and the need to decentralize the command structure:

a. Maneuver warfare requires subordinate commanders make decisions on their own based on their understanding of the commander's intent. Individual initiative and responsibility are of paramount importance.

b. C2 is decentralized, flexible, and dynamic.

c. Mission orders and plans are brief and their execution relies on the judgment and initiative of subordinate commanders.

In MAGTF operations, the commander determines which tasks need personal supervision during the execution of orders and the priority of each task. Control is implemented through deputy MAGTF commanders and staffs. Reconnaissance generally pulls the MAGTF (recon pull) and allows it to exploit enemy weaknesses quickly in order to shatter morale and physical cohesion.

11. MEF (FWD) C2 Facilities

MEF (FWD) combat operations centers (COCs) are the facilities (e.g., buildings, structures, tents, and vehicles) used by the commander and staff at each echelon to plan, direct, control, and coordinate operations of assigned forces.

a. The Main Echelon. The primary interests of the main echelon are directing current operations and planning future operations. The main COC is organized into two sections: the current operations staff and future operations staff.

(1) Current operations staff—

(a) Supervises mission execution (Army or Marine Corps component operations staff officer [G-3]).

(b) Coordinates combat operations (G-3).

(c) Coordinates required combat/service support (Army or Marine Corps component logistics staff officer [G-4]).

(d) Handles close and deep operations occurring within 12-72 hours (G-3, Army or Marine Corps component intelligence staff officer [G-2]).

(2) Future operations staff—

(a) Plans future, close, and deep operations beyond 72 hours (G-3, Army or Marine Corps component civil affairs staff officer [G-5]).

(b) Coordinates the C2 organization and support system (G-3, Army or Marine Corps component signal staff officer [G-6]).

(c) Monitors continuity of MAGTF operations.

(d) Determines friendly/enemy possible courses of action (G-3, G-2).

(e) Develops execution plans with key decision points and alternate plans (G-3, G-5).

(f) Ensures synchronization of operating systems in operation plans, branches, and sequels (all staff).

b. The Rear Echelon. The rear echelon's primary mission is to provide support to forces conducting combat operations. The rear echelon is located close enough to perform duties without engaging in close combat. The rear COC provides C2 over rear-area security operations, terrain management within the rear area, sustainment operations, control of administrative moves, and other associated functions. The rear echelon is often positioned near major ports, airfields, or telecommunications facilities, or it can remain sea-based.

c. The Tactical Echelon. The primary purpose of the tactical echelon (commonly referred to as the *command group)* is to provide the commander with freedom of movement and the information critical to situational awareness. Typically, the tactical echelon consists of the commander and representatives from the intelligence, operations, and communications staff sections. The tactical echelon must have the mobility and C2 support commensurate with its stated purpose.

12. MEF (FWD) Communications

a. Organization. The organization charged with the overall responsibility of MAGTF C3 is the CE. Just as the other elements of the MAGTF are made up of subordinate units that perform various missions and functions, the CE of a notional MEF (FWD) consists of a number of command support organizations as required, but traditionally include—

(1) A headquarters company.

(2) The general staff sections.

(3) A Surveillance, Reconnaissance, and Intelligence Group (SRIG) detachment (discussed in Chapter III).

(4) A reinforced direct support communications company. The DS communications company of the MEF (FWD) comes from the communications battalion found at the MEF. The company is tasked organized to support the functions discussed later.

b. Functions. The elements of the MEF (FWD) must be supported with communications resources whether afloat or ashore. When sea-based, the Navy amphibious task force provides termination into the Naval Telecommunications System (NTS). When ashore, the MEF (FWD) provides entry into the NTS or the Defense Communications System (DCS). Table II-7 shows communications capabilities and limitations associated with the DS communications company assigned to the MEF (FWD) CE.

Table II-7. MEF (FWD) DS Communications Company (Reinforced) Capabilities/Limitations Summary

CAPABILITIES	LIMITATIONS
• Provides CE with SC (VHF, HF, UHF) portable and mobile radio sets, to include SC UHF SATCOM (AN/PSC-3) • Provides CE multichannel (LOS UHF, SHF, and SHF SATCOM) connectivity to subordinates and higher units as part of the communications network. (AN/TRC-170, MRC-142, AN/TSC-85/93) • Provides CE with internal wire, telephones, and phone switching systems (digital and analog), to include STU-III, DSVT, DNVT, AN/TTC-42, SB-3865 and SB-3614 • Provides CE with an AUTODIN entry capability, to include stand alone GENSER and DSSCS personnel computers and follow on possibility of a message center (AN/MSC-63) • Provides CE with a tactical FAX (UXC-7A) capable of radio or wire interface • Provides CE with a secure E-mail to subordinate units using a Banyan Vines LAN. LAN includes direct server to server and dial up capabilities • Provides CE with DCS and or NTS access (DSCS, FLTSATCOM, or HF DCS entry) with (AN/TSC-85, AN/TSC-96, or AN/TSC-120)	• Limited numbers of SC UHF SATCOM radios • Cannot directly connect to MSE network via a SEN, due to signaling format difference. DTGs can only be established between ULCS (AN/TTC-42, SB-3865) and MSE switches (AN/TTC-47/48/39D) using CCIS trunks at NSC and LEN points of entry • Limited communications repair capabilities • Limited communications redundancy in equipment and personnel

Note:
AUTODIN - automatic digital network
CCIS - Common Channel Interswitch Signaling
DCS - Defense Communications System
DSSCS - Defense Special Security Communications System
DNVT - digital nonsecure voice terminal
DSVT - digital subsciber voice terminal
DTG - date time group
FLTSATCOM - fleet satellite communications
GENSER- general service
HF - high frequency
LEN - large extension node
LOS - line of sight
SATCOM - satellite communications
SC - single channel
SEN - small extension node
SHF - super high frequency
STU-III - secure telephone unit III
ULCS - unit level circuit switches
UHF - ultra high frequency
VHF - very high frequency

13. Command Relationships

In general, JFCs establish any of four basic command relationships to facilitate their C2 of the joint force. These include *operational control (OPCON), tactical control (TACON), support, or attachment* as discussed below:

a. OPCON. OPCON may be exercised at any echelon at or below the level of the combatant command. OPCON is inherent in combatant command (COCOM) and is the authority to perform those functions of command over subordinate forces involving organizing and employing commands and forces, assigning tasks, designating objectives, and giving authoritative direction necessary to accomplish the mission. OPCON includes authoritative direction over all aspects of military operations and joint training necessary to accomplish assigned missions.

(1) OPCON is normally exercised through service component commanders. OPCON in and of itself does not include authoritative direction for logistics or matter of administration, discipline, internal organization, or unit training. OPCON does include the authority to delineate functional responsibilities and geographic AORs of subordinate commanders.

(2) OPCON is also exercised by functional component commanders over assigned and attached forces and other forces as established by JFCs.

b. TACON. TACON may be exercised by commanders at any echelon at or below the level of combatant command. TACON is the detailed and usually local direction and control of movements or maneuvers necessary to accomplish assigned missions or tasks. TACON provides sufficient authority for controlling and directing the application of force or tactical use of combat support assets. TACON does not provide for administrative and logistic support; the commander of the parent unit continues to exercise those responsibilities unless otherwise specified in the establishing directive. TACON is typically exercised by functional component commanders over military capability or forces made available for tasking that are not assigned or attached to the functional component.

c. Support.

(1) A support relationship is established by a superior commander between subordinate commanders when one organization should aid, protect, complement, or sustain another force. The National Command Authorities (NCA) establish such relationships between combatant commanders when deployment and execution orders are issued to ensure the combatant commander tasked to achieve national objectives receives the support needed from other combatant commanders. JFCs may establish support relationships within the joint force to enhance unity of effort for given operational tasks, emphasize or clarify priorities, provide a subordinate with an additional capability, or combine the effects of similar assets.

(a) Mutual Support. Mutual support is the action that units render each other against an enemy because of their assigned tasks, position relative to each other and to the enemy, and inherent capabilities.

(b) General Support. General support is the action that is given to the supported force as a whole rather than to a particular subdivision thereof

(c) Direct Support. Direct support is a mission requiring a force to support another specific force's request for assistance.

(d) Close Support. Close support is the action of the supporting force against targets or objectives that are sufficiently near the supported force as to require detailed integration or coordination of the supporting action with fire, movement, or other actions of the supported force.

(2) Establishing supported arid supporting relationships between components is a useful option to accomplish needed tasks. For example, some naval operations, when conducted to enable or enhance air and land operations, can dramatically increase the successes achieved by the supported forces. This concept applies equally to all dimensions of the joint force. Each subordinate element of the joint force can be supported by other elements.

(3) As defined in Joint Pub 0-2, *Unified Action Armed Forces (UNAAF), "Unless limited by the establishing directive, the commander of the supported force will have the authority to exercise general direction of the supporting effort."* General direction includes the designation of targets or objectives, timing, duration of the supporting action, and other instructions necessary for coordination and efficiency. The supporting commander has the responsibility to ascertain the needs of the supported commander and take such action to fulfill them within existing capabilities, consistent with priorities and requirements of other assigned tasks.

(4) The establishing directive indicates the purpose in terms of the effect desired and the scope of the action to be taken. It should include—

(a) The strength of forces allocated to the supporting mission.

(b) The time, place, and duration of the supporting effort.

(c) The priority of the supporting mission relative to the other missions of the supporting force.

(d) The authority, if any, of the supporting force to depart from its supporting mission in the event of exceptional opportunity or an emergency.

(e) The general or special authority for any operational or other instructions to be issued by the forces being supported or by other authority in the action areas.

d. Attachment. Attachment is the temporary placement of a unit into another organization. Subject to limitations placed by the attachment order, the receiving commander has the same degree of C2 and the same responsibilities for logistics and administration over the unit(s) received as over organic units. The attachment order should specify the supply and maintenance requirements in terms of what the receiving and parent unit(s) will provide.

14. **Organization of Forces**

Once the JFC has established command relationships at the joint force level, the receiving MEF or corps commander may exercise several options in organizing their forces. In addition to the recommended options described below, the JFC may also elect to establish TACON or support relationships in organizing the joint force.

a. Army DRB to MEF Control. Regarding establishing a command relationship between an Army DRB and the MEF, three recommended options exist for the MEF commander designated as JFC:

(1) Attach the brigade to the MEF for employment by the MEF commander as a separate ground combat element.

(2) Attach or provide the brigade OPCON to the MEF GCE commander as a separate maneuver force.

(3) Attach or provide the brigade OPCON to a designated MARDIV to be employed within that division commander's scheme of maneuver. In a multidivision MEF, the MEF commander may act as the GCE commander or may designate a subordinate MARDIV commander as the GCE commander.

b. MEF (FWD) to Army Control. Based on authority prescribed in governing directives and METT-T analysis, the Army commander designated as the JFC may also exercise three basic options when task organizing the MEF (FWD) with Army forces:

(1) Attach the MEF (FWD) to a corps or echelon above corps (EAC).

(2) Attach the MEF (FWD) to an Army division.

(3) Place the MEF (FWD) OPCON to an Army division.

c. Transfer of Units. Army and Marine Corps forces are structured to operate most efficiently using service doctrine and TTP. However, there will be situations where circumstances dictate the need to transfer units at levels below the DRB or MEF (FWD) in order to optimize the capabilities of the joint force and accomplish the mission. *Desert Storm* offers one such example:

Historical Perspective:
Army-Marine Corps Integration During OPERATION DESERT STORM

"At the peak of the fight, the Brigade had 5500 soldiers under its command. I had our three battalions: 3-41 Infantry, 1-67 Armor, and 3-67 Armor. I also had Marine light armor infantry cavalry squadron [sic], the 1-3 Field Artillery, a reinforcing Marine battalion, the 502d Support Battalion, 142 Signal Battalion, A Company, 17th Engineers plus another Marine engineer company, and B Battery, 4th Battalion, 5th Air Defense Artillery from 1st Cav. I think that's all, but it was quite an operation...."

Colonel John Sylvester
Commander, "Tiger Brigade"

15. Liaison

Liaison requirements are specifically discussed in detail because of their importance in contributing to successful integrated operations and reducing instances of fratricide. To be effective, liaison teams must be properly trained, planned for, and integrated into all major headquarters' elements. In joint operations, robust liaison has provided critical linkage between supported, supporting, and adjacent commands and has contributed to the success of those operations. Liaison provides current expertise and representation for critical planning, coordination, and execution. (See Tables II-8 through II-11.)

a. Types of Liaison. The two types of liaisons are command and staff liaisons. Command liaison can enhance command relationships more effectively than a reliance on official communications alone. Staff liaison is essential for integrating, coordinating, and executing operations. Liaison may be performed by a single Marine or soldier or, if appropriate, a team with appropriate administrative and communications support.

b. Duties. Liaison officers (LNOs) advise the sending and receiving commanders. The sending commander is assisted in determining requirements, priorities, and required allocations. The receiving commander is advised on capabilities and doctrine/tactics of the sending command. The status of the sending and receiving commands is monitored to maintain a basis for advising. LNOs act as a 2-way conduit to coordinate and facilitate the flow of support and information between commands.

c. AMCI Liaison Requirements. Commanders must ensure their liaison teams are adequately manned and equipped to execute 24-hour operations and can communicate with their parent elements. The following tables provide recommended liaison exchanges between Army and Marine units during AMCI operations.

Table II-8. Liaison Requirements from DRB to MEF

FUNCTION	DRB to MEF
C2	• To GCE (command liaison)
	• To GCE (G-6 liaison)
INTEL	• To CE SRIG
	• To GCE G-2
MANEUVER	• To GCE G-3
	• To adjacent units as required
FIRE SUPPORT	• To force fires coordination center (FFCC) and senior fire support coordination center (FSCC)
ENGINEER	• To MAGTF engineer
AVIATION	• To ACE
	• To GCE G-3 air
AIR DEFENSE	• To ACE
	• To GCE G-3 air
LOGISTICS	• To FSSG
	• To GCE G-4

Table II-9. Liaison Requirements from MEF to DRB

FUNCTION	MEF to DRB
C2	• To BDE signal officer
INTEL	• To DS MI company as required
MANEUVER	• Lateral exchange as required
FIRE SUPPORT	• To BDE TAC fire support element (FSE) • To main FSE
ENGINEER	• To BDE Main CP
AVIATION	• To BDE TAC • FACs to maneuver battalions as required
AIR DEFENSE	• To BDE main CP
LOGISTICS	• To rear CP forward support battalion (FSB)

Table II-10. Liaison Requirements from MEF (FWD) to Corps

FUNCTION	MEF (FWD) to CORPS
C2	• To corps G-6
INTEL	• To joint intelligence center (JIC)/corps G-2
MANEUVER	• Lateral exchange as required
FIRE SUPPORT	• To Corps FSE • To maneuver units as required
ENGINEER	• To Corps engineer BDE CP
AVIATION	• To Corps operations (G-3 air) • To maneuver units as required
AIR DEFENSE	• To G-3 air
LOGISTICS	• To corps support group
	• To corps G-4

Table II-11. Liaison Requirements from Corps to MEF (FWD)

FUNCTION	CORPS to MEF (FWD)
C2	• To Command (CMD) group
	• To MEF (FWD) G-6
INTEL	• To SRIG
MANEUVER	• Lateral exchange as required
FIRE SUPPORT	• To FFCC and senior FSCC
ENGINEER	• To MEF (FWD) engineer
AVIATION	• To ACE
	• To CE G-3 air
AIR DEFENSE	• To ACE
LOGISTICS	• To FSSG (FWD)
	• To MEF (FWD) G-4

16. AMCI Communications

In order to C2 forces effectively, the commander and staff rely on a communications system that facilitates the passing of information among echelons quickly and accurately, in both secure and nonsecure modes. At the brigade/ regiment level and below, the Army and the Marine Corps use similar equipment (see Table II-12). Communications challenges include interoperability issues, communications procedures, and com - munications security (COMSEC).

Table II-12. Typical Communications Systems Available from Marine Corps DS Comm Co (Reinforced) and DRB Signal Section

EQUIPMENT	MAGTF* (MEF FWD) DIRECT SUPPORT COMM CO	DRB
COMBAT NET RADIO (CNR)/ SINGLE-CHANNEL RADIO (SCR)	MRC-145- (4) PRC-119- (25) VRC-88- (2) PRC-113- (4)	**SINCGARS - PRC- 119, VRC-88, 89, 90, 91, and 92
SWITCHING	TTC-42- (1) SB 3865- (3) SB 3614- (3)	MSE - TTC-47, TTC-48
MESSAGE CENTER	MSC 63A- (1)	
COMSEC	VINSON KY-57 ANDVT KY-99 PACKHILL KY-65A DLED KG-84C	VINSON, DSVT, KY-99
TACTICAL FAX	UXC-7A- (3)	UXC-7A/B
TELEPHONES	DNVT- TA-1042 and 954 DSVT- KY-68 ANALOG- TA-312, 838 and STU-III	DNVT - TA-1042, DSVT - KY-68 ANALOG- TA-312, TA-838, TA-1035 STU-III
MULTICHANNEL	TRC-170 V3- (4) MRC-142- (10)	
UHF TACSAT	MRC-140- (2) PSC-3 -(6) AN/TSC-96- (1)	MST-20 PSC-3
SHF MULTICHANNEL GMF SAT	TSC-93- (2)	AN/TSC-85, AN/TSC-93
HF	MRC-138- (12) PRC-104- (4) AN/TSC-120- (1)	AN/GRC-193, PRC-104
NAVIGATIONAL AIDS MSE	GPS w/GCE	EPLRS NCS (2), SEN (8), RAU (2), R-RAU (2)

* Includes systems from elements of the MAGTF Comm Bn.
** Single-channel Ground and Airborne Radio System (SINCGARS) and VRC-12 types of equipment numbers are the same depending if SINCGARS fielding is complete.

a. Interoperability. USMC and Army units use SC FM radios to communicate at lower unit levels. Both services make use of UHF tactical satellite (UHF TACSAT), although the Marine Corps has fewer TACSAT assets than the Army. The Army employs MSE extensively and when operating with Marine Corps units should consider providing MSE to Marine units at critical interface points. Experience, including that of the "*Tiger Brigade*" working with Marine forces during the Gulf War, has shown that providing MSE to the DRB in addition to SC communications greatly enhances C2 during integrated operations. One technique, as recommended in the Army's white paper on armor support to the Marine Corps, is to augment the DRB with a signal communications company (-) from the division signal battalion to provide MSE connectivity between the TOC and brigade support area (BSA) and their MAGTF counterparts.

b. Communications Procedures and Considerations.

(1) Planning. During this phase, coordination between Army and Marine forces with respect to communications is imperative. Procedural planning coordination deconflicts interoperability problems that may prevent initial C2 effectiveness. Both services have procedures and equipment that are peculiar to their organizations. Discussed below are interoperability-specific procedures that assist in effective C2 execution:

(a) "UHF Voice SATCOM. Upon arrival in the AOR, the DRB or MEF (FWD) should activate the higher headquarters (HHQ) or JTF (MEF or Army Corps) SC SATCOM circuits. The DRB or MEF (FWD) should bring SC SATCOM assets for internal and external uses. Intertheater Communications Security Packages (ICPs) are required. The satellite access authorization message will assign 5 or 25 kilohertz (kHz) channels.

(b) HF Voice. Upon arrival in the AOR, the DRB or MEF (FWD) should activate the HHQ (MEF or Army Corps) SC HF circuits. The DRB or MEF (FWD) should bring mobile and portable equipment for internal and external uses. Use KY-99s and ICP COMSEC. Frequencies and call signs are assigned in accordance with (IAW) the operation plan in concept format (CONPLAN) or JTF joint communications-electronic operating instructions (JCEOI)/ joint signal operating instructions (JSOI).

(c) UHF/VHF Voice. Upon arrival in the AOR, the DRB or MEF (FWD) should activate the HHQ (MEF or Army Corps) SC UHF/VHF circuits. The DRB or MEF (FWD) should bring mobile and portable equipment for internal and external uses. Use ICP COMSEC. Frequencies and call signs are assigned IAW the CONPLAN or JTF JCEOI/ JSOI.

(d) SINCGARS. Upon arrival in the AOR, the DRB or MEF (FWD) activates the HHQ or JTF SINCGARS circuits. ICP trunk encryption key (TEK), transmission security key (TSK), and hopsets are required. The NET IDs are IAW the CONPLAN or JCEOI/JSOI. If ICP TSK and hopsets are not available, the HHQ or JTF must send the DRB or MEF (FWD) a data transfer device (CYZ-1O) for direct transfer of SINCGARS FH data; complete a file transfer with the FH data via a secure means such as a STU-III; and physically transport the file/disk.

(e) Transmission Systems and Telephone Switched Networks. Use SC radio communications throughout the operation between Army and Marine units; however, major subordinate command staffs use telephones to accomplish most coordination. Although interoperable, the Tri-service Tactical Communications Program (TRI-TAC) unit level circuit switches (ULCS) employed by Marine units (SB-3865/TTC-42) and the MSE employed by the Army (TTC-46/47/48/39D) require planners to employ specific techniques and procedures to overcome equipment incompatibilities.

• The first planning consideration is the trunk group data rate used by MSE and ULCS. ULCS will support both modulo 8 (256/512 kilobits per second [kbps]) and 9 (288/576 kbps) trunk group rates. MSE will only support modulo 8 rates. Additionally, the Marine Corps MRC-142 UHF LOS multichannel radio will transmit only CX-11230 modulo 9 trunk groups.

• The second planning consideration is the interswitch trunk signaling formats utilized by MSE and ULCS. Both use the CCIS format between large and medium switches (TTC-39, 42, 46, 47) but use different forms of digital in-band interswitch trunk signaling (DIBITS) to small switches (TTC-48, SB-3865). ULCS cannot directly connect to a SEN (TTC-48). The TTC-42 can directly connect to a TCC-39D, TTC-46, or TTC-47. The SB-3865 can directly connect only to a TTC-42 or TTC-39D.

• The third planning consideration is the type of transmission path used for the interswitch trunk. In addition to the limitation of the MRC-142 modulo 9 trunk rate, greatly modulated frequency (GMF) satellite (AN/TSC-85/93) will not receive a call from MSE if there is a terrestrial link. At present, the flood search routing utilized by the MSE switches precludes the use of a GMF and terrestrial path simultaneously. This is due to a time delay encountered by MSE flood search calls over GMF paths that causes a call to be routed over terrestrial paths. When fielded, the circuit switch task execution plan (TEP) will reduce the impact of this limitation by allowing MSE switches to direct calls down GMF paths. However, once a terrestrial path is established, the GMF path will not be used by MSE originated calls and will serve only ULCS originated calls.

• The fourth planning consideration is the number of area codes utilized to support the telephone switched network. Presently both MSE and ULCS equipment pose limitations on the employment of area codes. The MSE switches are capable of crossing the area code boundary between the ULCS (TRI-TAC) and MSE networks to one gateway switch. In order to connect the MSE network to another UCLS switch, the system requires that the second UCLS switch be in a separate area code. The TTC-42 (UCLS) is only capable of being programmed to accommodate its own area code and two others. With MSE, UCLS, and defense switched network (DSN) each being in separate area codes, this is a critical limitation. The TEP will help alleviate this concern by allowing UCLS and MSE switches to reside within the same area code.

(2) Although there are many ways to accommodate the planning considerations listed, the techniques described below can be employed quickly to provide telephone service between Army and Marine units:

(a) During the initial phases of an operation, Marines can establish a MRC-142 link to the Army and provide long local telephone service using remote multiplayer combiner (RMC) and DSVT/DNVT telephones.

(b) The Army can provide a LOS radio link to the Marines and provide long locals from the MSC network.

(c) A TRC-170 link can be established between Army and Marine units using the TD-1235 to provide long local service in both directions. This will be particularly useful when the ULCS switch is the SB-3865 that cannot directly be connected to the MSE SEN, LEN, or net control station (NCS).

(d) If the TTC-42 is employed by the Marines and the Army employs a NCS, LEN, or TTC-39, an interswitch CCIS trunk group can be established directly between switches.

(e) If Marine units are operating within LOS distance of an Army remote access unit (RAU), the Army can provide mobile subscriber radio terminals (MSRTs) to the Marines.

c. Communications Security. Marine battalions and regiments have COMSEC accounts but generally have only Marine/ Navy versions of COMSEC software. Battalions and regiments do not hold joint software packages like the ICP; however, these packages are available at the MAGTF GE. Consequently, the receiving organization (corps or MEF) must provide applicable COMSEC software and subsequent *"fills"* throughout the duration of the AMCI operation. This may necessitate the acquisition of COMSEC materials above the normal holdings of the receiving force.

17. Fratricide Prevention

Given the complexity inherent in combat operations in general and in integrated operations in particular, commanders at all levels must consciously and deliberately reduce the potential for fratricide. Specific measures for implementation include but are not limited to—

a. Development and disciplined use of common operational graphics and associated control and fire support coordination measures (FSCM) throughout the joint force.

b. Development and disciplined use of an equipment marking system effective during all visibility conditions.

c. Guidance and restrictions governing the authority, use, reporting, marking, and clearing of mines and munitions with high submunition dud rates.

d. Policy regarding naval surface fire support during amphibious operations to ensure safety of amphibious shipping and joint forces operating in the amphibious objective area (AOA).

e. Policy regarding use of special munitions and fuses (e.g., variable time fuse).

f. Weapons employment restrictions.

g. Target identification and engagement criteria.

h. Prohibited targets.

i. Implementation of positive clearance of fire procedures for indirect fire systems and positive identification of ground targets before engagement by air crews.

The primary mechanisms for minimizing the risk of fratricide are disciplined execution of operational plans and SOP; close vertical and horizontal coordination among components and subordinate forces and echelons of the joint force; and acute individual and collective situational awareness.